

# Plant Wise

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## FOREST FOR THE TREES

Ancient forests. We call them primary forests when they are uncut, or old growth, original, virgin. Not disturbed by humans, sustaining the most intricate network of lifeforms, all dependent on the presence of each other. A vibrant puzzle that needs each and every piece, however small and subtle, to live. The trees may be the biggest beings, or perhaps the giant underground fungal networks, but all the roles count, and no one is the star.

Herbalist Feather Jones writes, in "The Language of Old Growth": "An original forest is a roadless area that has never been managed by human animals and their machines...an area with intact ecosystems and wildlife corridors, not just defined by trees, but mosses, plants, fungi and animals that are all interdependent; those parts of the forest that are lost forever when trees are cut." Walking alone in a old growth forest in the Rockies, she observes, "As with no internal urging or warning, my consciousness seemed to shift to a different degree of awareness. With the feeling of every cell in my body becoming attentive, I recognized patterns in the underbrush that were invisible before...There was also this irresistible urge to run, as if either Pan or a grizzly bear was going to walk out from behind the next tree. I felt if I stayed there any longer without moving I would become a part of the forest, invisible to myself or anyone else...There is nothing human or civilized for your left brain to lock onto. Just a primitive, wildly flowing energy that cannot be taken in by any thought processes, but has to be absorbed into the human body through instinctual, intuitive and earth-centered connections."

In the Amazon, as in the view of other indigenous cultures still imbedded in nature, every plant has a spirit, a teacher who lives in it. The forest is also populated by spirits, entities who

teach, take you deeper in, sometimes play tricks. But their existence requires that the puzzle be intact. After working in Ecuador, ethnologist Bret Blosser wrote, "On the Rio Napo I was impressed with the healers, and with how closely their work is tied to primary forest. They cultivate the plants in their gardens, but their instruction during the learning phase, and their help during every ceremony, comes from *Sacha Runa* and *Sacha Huarmi* (forest men and forest women, teaching spirits) who dwell *only* in primary forest." Once the trees are cut, even selectively, and the road dissects the watershed, the fabric is torn and the original and ruling spirits are gone too. Where do they go? To the deeper forests, the remnants. Will we be able to preserve the remnants?

In the Northwest US, home of the huge and ancient redwood forests, the spotted owl has become—by its very vulnerability—the tutelary animal, the protecting spirit. The spotted owl is standing as the symbol for all the lacework of lifeforms. Also in the Northwest and Canada, the Pacific yew tree (*Taxus brevifolia*) is now the test case for our priorities in another way: Should we decimate the population because the bark is so effective in fighting ovarian cancer, or preserve the species (and the forests they dwell in) and work to mimic nature in the laboratory. There is irony in our having rediscovered ethnobotany, a gift of nature, only to have it collide with our fledgling environmental awareness.

Whatever the motivations for harvest, focusing on the "natural resources" and their utility for humans misses the more elusive point that we need the presence of the ancient ecosystems because in them dwell the ancient spirits. We may not encounter them often, but it seems essential to know that they are there. **Kathleen Harrison-McKenna**





## FOREST MEDICINE HAS VALUE IN BELIZE

Scientists have developed the first evidence that harvesting locally used medicinal plants from tropical forests could be more lucrative than clearing the land for farming or growing timber.

Such evidence could help convince policy makers that forests should be preserved, as well as show local people who rely on the forest for income, and are tempted to clear it, that they have a stake in its preservation, said the researchers, Dr. Michael Balick, director the the Institute of Economic Botany at the New York Botanical Garden, and Dr. Robert Mendelsohn, associate professor of forest policy at Yale University.

With the help of a local herb gatherer, Dr. Balick collected from two plots of mature, secondary growth hardwood forest all the medicinal plants that could be sold to local herb pharmacists and healers. The plants are commonly used in the treatment of ailments like rheumatism, indigestion, colds and diarrhea.

The first plot, .7 acre of 30-year old forest in a low-lying valley, yielded 86.4 kilograms of five different species. The second plot, .6 acre of 50-year old forest in the foothills of the Maya Mountains, produced 358.4 kilograms of four species. At local market rates, accounting for labor costs, the plant materials from the two plots are worth \$564 and \$3,054, respectively.

They then calculated the value of the plant material in each plot assuming it could be harvested on a sustainable basis. Theoretically, an herb gatherer who owns 30 acres of

forest that takes 30 years to mature could harvest one acre each year. Each section would then have 30 years to regenerate before it was reharvested. The current value of medicinal plants on the two study plots, given such a sustainable harvest, they found, is \$294 and \$1,346 per acre.

When compared to other land uses, medicinal harvesting appears to be one of the most valuable uses of the land. Other scientists have found that clearing rain forest for agriculture is worth \$137 per acre in Brazil and \$117 per acre in Guatemala.

Conservationists often argue that tropical forests should be preserved because they may contain undiscovered medicinal plants that would be worth billions of dollars if developed into drugs. That argument for preservation, which might not pay off for another decade, is of little interest to the farmer who needs to feed his family.

"We wanted to identify what is valuable to the small farmer today, because he decides whether to cut his piece of the forest to feed his family or to use it in another way to derive income," Dr. Balick said. "For the first time we are not talking about medicinal benefits that are years in the future. We are talking about benefits that people are realizing today." The next step is to work with farmers to develop nondestructive harvesting methods. [This kind of harvesting] could be done in the secondary growth forest or the buffer zones around the preserves, but should not be done in preserves themselves.

(Source: *New York Times*, 4/28/92, by Catherine Dold.  
Thanks to David Schneider for the article.)



### WHAT IS BOTANICAL DIMENSIONS ?

Botanical Dimensions is a non-profit 501(c)3 organization, founded in 1985, dedicated to collecting living plants and surviving plant lore from cultures practicing folk medicine in the tropics worldwide. Ethnobotany is the study of plants used by people: for food, fiber, building and medicine. Ethnomedical plants are those used to prevent and cure illness, to maintain well-being of the body, mind and spirit. Because the medicinal plants are endangered, we support live plant and seed collection efforts in Central and South America, Africa and Asia. We maintain a private botanical garden in Hawaii, propagating the living collection for research and genetic diversity, and support a locally-run ethnobotanical garden in Peru.

In California, we coordinate educational outreach, keep a plant database, fundraise, and publish this newsletter, *PlantWise*.

*The shamanic tradition of plant medicine is as fragile as the rainforest itself.*

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## A Genetic Subset of the World Flora: Conservation of the Fabric of Plant Diversity

Alan M. Kapuler, Ph.D.

President of Peace Seeds

Research Director, Seeds of Change



**In the blink of a few generations,** almost all native habitats have been impacted by human beings. We are overrunning this small, beautiful and fertile planet in ways that change biological diversity. In high altitude mountain cloudforests, hundreds of species of epiphytic orchids disappear with the introduction of a few cattle. Similar examples of our destruction abound, variously called development and/or progress. That the problem is planetwide, simultaneous and rapid makes salvation very difficult. From a particular vantagepoint that I summarily outline in the next several paragraphs, it is clear that although difficult, conservation of the essence of diversity is possible and can be used to make an educational process open to all of us.

A few individuals, successful in a particular habitat, soon propagate and multiply. As many generations unfold, these individuals become a species. The species inhabits one to several, then many overlapping ecologies until several closely related species exist, all part of a common genus. Hundreds to thousands or more generations pass, conditions vary, adaptation and selection continue until several genera now exist. As we continue to project this process through time the initial few individuals can be seen to have given rise to tribes, families, orders and superorders. For example, chloroplast DNA analysis of the Asteraceae, the largest family of dicots, in congruence with morphology and physiology, finds that one clade of the Mutisia tribe is unique from the three other parts of the tribe and from the other 13-16 tribes of daisies as well.

Estimates of the size of the Plant Kingdom [spelling intentional, denoting a network rather than a hierarchy] vary, but the basic layout for the plants has commonly agreed upon features. For all plants, from mosses and liverworts to the angiosperms, there are about 760 families, 13,600 genera and 272,000 species (for a recent summary see Mabberley, 1989, *The Plant Book*). There are ten major divisions; bryophytes, psilophytes, lycopods, horsetails, ferns, cycads, ginkgo, gnetophytes and angiosperms. Taxonomy developing for centuries and millennia becomes a major ally in allowing us to discover, collect, grow and maintain the fabric of diversity that has taken hundreds of millions of years to develop. In the mid 1970's, the eminent Danish botanist Rolf Dahlgren presented a two-dimensional bubble mapping system (1975,

Bot. Notiser 128:119-147) that permits a clearer view of the relationships among plants beyond the family level. Most of our texts and most botanical science has focused on species, genera and families. To encompass the scope of plant development, we need to understand the connections between families and their larger integral units. In the flowering plants there are about 550 families, 106 orders and 36 superorders (Dahlgren 1980, Bot. J. Linnean Soc. 80:91-124). Although

habitats are disappearing and species becoming extinct, we need to conserve the fabric of diversity. We can do this only if we know its structure or at least enough of its structure to make a representative subset of the existing diversity. The Dahlgrenian bubble mapping system not only becomes a format for understanding the connections between major groups, subgroups and components all the way to individuals but provides an organizational structure for building gardens based on kinship.

Science has been unfolding the lotus of plant diversity based on the multivariate analysis of many kinds of characteristics. To unite this analysis with conservation, we can reverse the disjunctive process by choosing those species that manifest most of their generic traits and plant them in gardens

that permit their relationships to be seen. Understanding diversity will rely on gardens organized genealogically. Conservation will rely on gardeners whose kinship gardens become the sanctuaries for diversity and the vehicle for learning. Kinship Gardening can be viewed as the experimental science of coevolution. Botanical scientists, by providing analytical genealogies that illustrate the structure of the many plant groups and gardeners, by maintaining living collections of plants, are essential allies. This combined endeavor allows us to understand which species, genera, tribes and families need to be collected and maintained. This much needed human feedback loop is essential for the conservation of diversity to succeed. At the same time, the fabric that relates diversity to gardening can be communicated to field botanists, seedspeople and horticulturalists so that the rare and obscure kinds of plants that need to be available to us can be brought into cultivation. Of the nearly 300,000 plant species, a 1% subset organized in a garden to illustrate the structure of diversity would contain several thousand plants. Bioregional gardens containing 5-10% subsets would permit deeper representational layouts specific to locally adapted and diverse



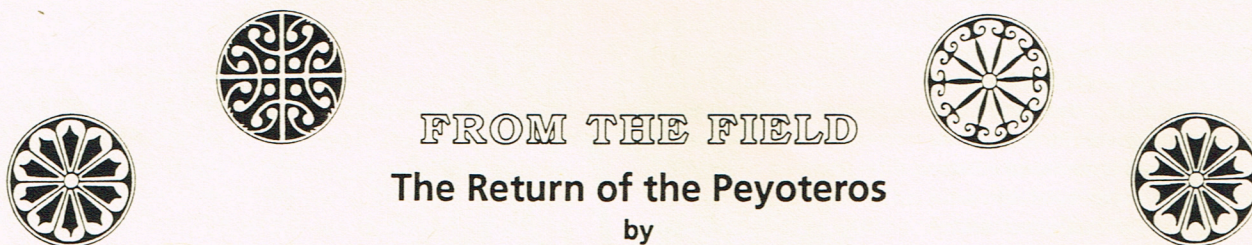


families. In the southwestern USA, the sunflower and senecio tribes of the daisies are endemically diverse; a tribal and subtribal garden of the asters would be remarkable in this bioregion. Other traits follow as well, from DNA to the biochemistry and physiology that lead some plants to be medicinal, others to be used in the kitchen or to provide material for our clothes.

After the initial presentation of Kinship Gardening in 1987 (Peace Seeds Res. J. Vol. 3), coevolutionary layouts for the Coniferophytes, Asparagus Alliance (Asparagales), Solanaceae, Palms (Arecaceae), Composites (Asteraceae), Grasses (Poaceae), and Carrot-Ginseng Alliance (Araliales) have been presented in subsequent issues of the journal (Volumes 4-6, 1988-91). These analyses which relate species to genera, subtribes, tribes, families and orders connect to super-order, divisions and the entire fabric of terrestrial plants. Gardens relating this marvelous fabric of life are a major work of the next millennium. As we destroy the natural evolution-

ary gardens of this planet, we can replace them, at least in part, with architectural ones conservatory in design and didactic of genealogy. Even as we eliminate many species, some are chosen to become enhanced, sometimes enormously. Whereas there are 65-70 species of Paphiopediums, the genus of semi-tropical Lady Slipper Orchids, there are thousands of hybrids. There are more individual genetic mutant kinds in a few bacteria and their viruses than there are genera of plants. We are interacting with the balance of Nature. Change is still the law. We can conserve the fabric as most of its nature is becoming clear to us. The kinds of plants we conserve determine the next fabric that will arise from them. The techniques of cellular and molecular biology open up the genetic apparatus to new kinds of plants, to an unfolding panoply of gardens. We have yet to plant and grow the Gardens of Eden.

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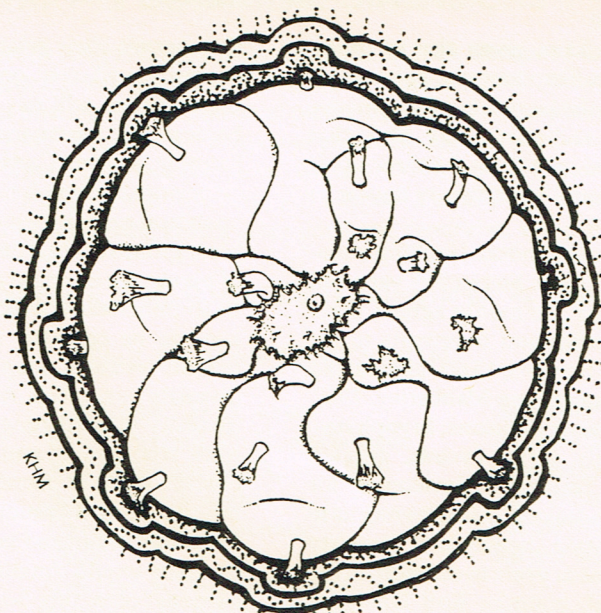
The ceremonial use of psychoactive plants played a major role in the religious life of a great many Mesoamerican societies at the time of contact. The Spanish succeeded in eradicating the practice virtually everywhere that they encountered it. Despite this persecution, the ritual use of entheogens did survive in the covert healing ceremonies of village shamans in a few locations in the highlands of Oaxaca, Mexico. The public ceremonial use of entheogens, however, faded. Many communities met their need for a sacrament which provided a profoundly altered state of being for participants in public, community-wide, multi-day ceremonies by substituting for their proscribed sacred plants the distilled spirits which the Spanish had introduced. Observing the mastery of Tzeltal religious leaders on cane liquor in the highlands of Chiapas, one cannot help but wonder how well plant-inspired illumination might have been woven into the fabric of community religious life. This ancient thread of Mesoamerican life is not entirely lost. A few small Huichol communities in the rugged Sierra Madre Occidental of northwestern Mexico continue to practice the peyote-based religion of their ancestors.

I recently had the good

fortune to be invited to attend the fiesta of the return of the peyoteros (peyote pilgrims) at one of the more traditional Huichol ceremonial centers. Thirty-three peyoteros—wearing dazzling outfits and carrying their basket backpacks, blankets, water bottles, and feathered ritual instruments—formed a reception line in the plaza. They had the journey-worn but proud bearing of people who have traveled far, accomplished much, and returned with the gold. It appeared to me that the gold was not just peyote, but also the deep connection which they had made on behalf of their commu-

nity with the Sun, the Blue Deer, the Rain Mothers, and the other deities. Everyone over the age of about thirteen went down the reception line greeting the peyoteros and receiving a slice of fresh cactus from each one. This was the beginning of three days and two nights of continuous ceremonial activity which included rituals, prayers, offerings made in temples, music, dance, and clowning.

For the most part I stayed in the background, but at one point one of the lead peyoteros called me over. "Do you like peyote?" "Yes." He motioned me to join in. I followed community members down a line of peyoteros. We knelt in front of, but facing away from, each one.



*Lophophora williamsii* (Cactaceae): Peyote

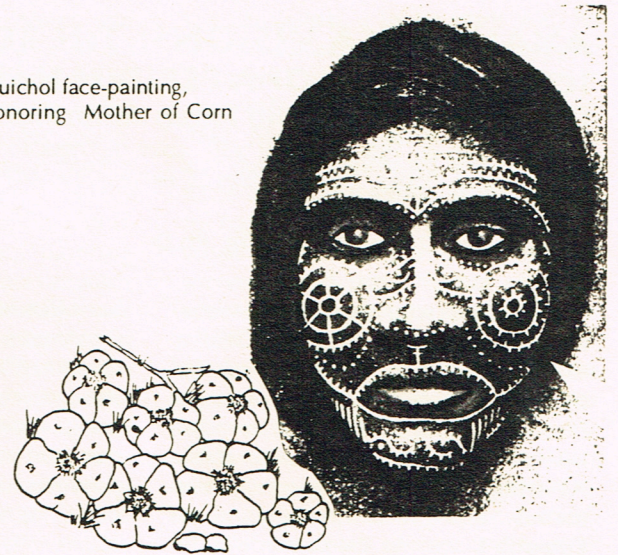


Each peyotero in turn gave us a candle to hold, dabbed holy water from the peyote desert on the tops of our heads, and offered us flowers dripping with holy water to suck. We took slices of peyote from each peyotero's bowl.

In the early afternoon the peyotereros filed out of the ceremonial center, led by musicians playing a lilting tune on a tiny fiddle and a tiny guitar. In their feathered hats and brilliant clothes they would wind up the switchbacks of the trail that climbs the steep and rocky bluff. Then came the sound of an axe, of a tree falling, of more chopping, and finally the blare of the peyotereros' cow horn trumpets. A group of men and boys, with only two older women, hurried out on the same trail with musicians in the lead. I knew by the ropes which the men and boys carried that they were going to help carry firewood. "Would it be okay for me to go along and help?" "Yes, come on, lots of us are going because there will be peyote." We found the peyotereros seated on the rocky hillside in pleasant sunshine, surrounded by oak trees. I noticed that many of the firewood helpers wore oak leaves in their hats. A couple of the peyotereros were standing, facing the sun, holding their *muwieries* (feathered wands), and praying intensely and continuously. Bright yellow patterns, painted with a paste derived from a root that grows in the peyote desert, lit up the peyotereros' cheeks. Some of our party set to work dropping trees and limbs and chopping them into lengths. A boy of about thirteen scrambled high up into an oak and skillfully cut a limb. Hoots of approval. A robust young man danced backwards across boulders when the trunk he was working on rolled after him. Yells and laughter. The intense praying continued for the hour or more that it took us to ready our loads. Then came a call to receive peyote. We hurried over boulders to a pile two feet across of fresh slices. "Make your tacos!" and "Head tacos!," joked the peyotereros. Some of the young men came away with big handfuls of juicy cactus. Yellow designs danced across the peyotereros' cheeks. I got the impression that the peyotereros were deeply identified with the abundant energy of sun, oak, and fire. The men hoisted their bundles onto their backs and followed the procession down the trail. The two women and I carried firewood in our arms. We added our wood to the large supply by the kiva-like community temple, picked up a dry stick from the supply, and descended into the temple. I was unprepared for the charged atmosphere of the packed chamber. Stunned, I followed the two women around the central column of flame. Oceanic energy surged and hummed in the darkness and firelight. I laid my stick on the fire, took note of a round stone with a central hole which I realized must mark the *sipapu*-like entrance to the underworld, and headed up the steps and out.

The survival of peyote religion in the more traditional Huichol communities is a remarkable achievement of cultural protection. What are the prospects for Huichol cultural integrity in the face of accelerating pressure on the Huichol Sierra from the mainstream culture? One hopeful sign is the dedication of the many teenage peyotereros (and non-peyotero teenage community members) to the tradition. They clearly found the ways of their ancestors to be the hottest game in town and were intent on picking up the intricacies of the tradition which their elders were laying out. I was also encouraged to learn that the region's most successful Mexican-style Huichol entrepreneur, a truck and store operator, was to become a peyotero in the next cycle.

Huichol face-painting,  
honoring Mother of Corn



The teenage peyotereros and the store-owner are not just participating in colorful and psychoactive festivities. Peyotereros "sign on" as a group for five-year cargos (periods of religious obligation) which require them to reside in the ceremonial center for months at a time, to participate in numerous difficult pilgrimages, and to maintain close relationships with demanding deities. The cargo group represents the whole community in the realm of the gods and functions as a school of religious studies in which the older peyotereros initiate and guide the younger ones.

Despite this vigor, the survival of Huichol culture is very much in question. Logging companies, with government help, are pushing new roads far into the Huichol Sierra and have begun to cut the forests. The Mexican government is threatening to open all communal land holdings to private titling and sale to outside interests. Many Huichol have begun to seek power, wealth, and identity outside of their tradition.

The traditional Huichol communities need allies in their struggle to evolve in ways which maintain their cultural integrity. Providing such support is tricky. Aid projects are often based on good ideas which do not make sense to the people they are meant to help. I have learned about two efforts which the Huichol with whom I visited have begun and which they feel will contribute to the well-being of the whole community. Please consider contributing financial support to these efforts. About \$6000 is needed over the next three years to support the university education of a woman who will become the first Huichol physician. About \$2000 a year is needed for one full-time salary and material for a fruit tree nursery and orchard project.

To support these efforts please send tax-deductible contributions to **Friends of the Huichol**, c/o George Howell, 157 Hillside Ave., Arlington MA 02174.

For more information contact the author, *Bret Blosser*, at P.O. Box 781, Moab UT 84532.

**Bret Blosser** is an ethnologist with many years experience apprenticing with native healers as well as conducting field courses in Central America.



# AYAHUASCA VISIONS: THE RELIGIOUS ICONOGRAPHY OF A PERUVIAN SHAMAN

Luis Eduardo Luna and Pablo Amaringo

1991. Hardcover, 159 pp., 49 8"x10" color reproductions.

North Atlantic Books, 2800 Woolsey St, Berkeley CA 94705. \$60.00

Reviewed by Dennis McKenna, Ph.D.



Readers who appreciate visual representations of shamanic reality should prepare to be astonished and delighted. This work represents the fruit of a years-long collaboration between the Peruvian artist, Pablo Amaringo, and Colombian scholar, film maker, and anthropologist, Luis Eduardo Luna. As the person who introduced these individuals to each other in the summer of 1985, I can make some small claim to having fostered their relationship, which in the years since, has led, among many other remarkable things, to the publication of this extraordinary work. For the same reason, I can make no pretense of objectivity. The authors are close and valued friends; I am happy to see that their persistence and hard work together has turned out so beautifully.

The term *ayahuasca*, a Quechua word meaning "vine of the souls," will be known to most readers of this journal, as well as others versed in the lore of shamanism. Ayahuasca, also known as *yage*, *natema*, and various other names, is a psychedelic drink made by boiling the bark and stems of an enormous jungle

liana (*Banisteriopsis caapi*), together with the leaves of another plant, usually *chacruna* (*Psychotria viridis*). Indigenous Amazonian shamans specialize in the use of these plants for healing, divination, and sorcery. Both species contain powerful hallucinogenic alkaloids, which synergize and reinforce each other. Ayahuasca is also the central mystery and primary shamanic technology of *vegetalismo*, a syncretic form of shamanism widely practiced among mestizos throughout the Amazon. The visionary experiences provided by ayahuasca enable the shaman, or *ayahuasquero*, to acquire his or her magical powers, and to learn healing, divination, and the uses of medicinal plants. In that transpersonal realm the ayahuasquero encounters and forms alliances with spiritual entities who protect, guide, and help the practitioner to counter the influences of malevolent sorcerers and their spirit allies. Ayahuasca has been known and studied by ethnographers, botanists, chemists, and seekers since the mid-nineteenth century, when its use was first observed and described by the explorer, Richard Spruce. Luis Eduardo had already been working on the ethnography of ayahuasca and Peruvian *vegetalismo* for over four years when I introduced him to Pablo (whom I had met several years earlier) in the summer of 1985, while we were plant collecting in southern Peru. During this visit, Pablo told us about his former life as an ayahuasquero, and showed us some of the finer examples of his landscape paintings. We suggested that he try to paint some of the visions that he could recall from memory. Two days later, we were looking at his initial attempt at visionary art, the first two works of hundreds to come.

What makes *Ayahuasca Visions* unique is that the paintings reproduced in its pages demonstrate the reality of the shamanic worldview in an immediate, forceful, and nonverbal manner that

no dry ethnographic treatment could ever hope to do. One can view these paintings simply as a peculiar and interesting form of primitive surrealism, the products of a fertile imagination exposed to a wide array of syncretic influences, and at that level, they are both fascinating and beautiful. But these paintings are more than that; they are eidetic snapshots of another dimension, a dimension seen and experienced by Pablo Amaringo during his years as a *vegetalista*, and which, for him and others like him, is at least as real as the familiar everyday world that we all know. Pablo's visions are not unique; in fact, they are composed of elements which make up the consensual reality shared by those who practice *vegetalismo*. Pablo Amaringo is unusual because his skills as a painter, together with a photographic memory, enable him to depict this visionary world for those of us who cannot access this dimension first hand by ingesting ayahuasca and observing the diet and other practices that are required for the discipline of *vegetalismo*.

The opening chapter begins with Luna's personal account of the events which led him to dedicate his life to the study of ayahuasca shamanism. His ethnographic work in the Peruvian Amazon, which earned him his doctorate in anthropology at the University of Stockholm, is also succinctly recounted. This is followed with a short biography of the artist, Pablo Amaringo. Although coming from a long line of traditional healers, it was not until he was miraculously cured of a debilitating illness by drinking ayahuasca that he seriously took up the practice of *vegetalismo*. It was also during this convalescence that he acquired his skill as an artist. In the final chapter in the introductory section, Luna comments on the artistic and syncretic influences on Pablo's style, and explains the significance of the iconographic motifs encountered in the





visionary paintings. While there are numerous visual themes which occur frequently in the paintings, Luna has singled out some of the most conspicuous for comment and further elucidation. One of the most common motifs is that of the ayahuasca session itself; nearly all of the paintings depict a group of vegetalistas, gathered around the ceremonial ayahuasca pot, ministering to patients and singing their *icaros* (magical songs used for curing and other shamanic tasks), while all around them roil and boil the demons and deities, the sorcerers and saviors of the visionary universe to which ayahuasca is the portal. Sacred plants are also frequently depicted, together with their spiritual and physical "mothers" (the *ayahuasca* vine, for example, has a grasshopper, a *chicua*—a type of bird—and a snake as its invisible guardians). These plants and their spirits are an important source of shamanic gnosis to the *vegetalistas*, and it is a testament to Pablo's attention to artistic detail that they are rendered with botanical accuracy; indeed, wherever possible, Luna has supplied the scientific names of most of the plants and animals depicted in the paintings, making this book a valuable reference for ethnobotanists and ethnozoologists. Another constant motif is that of the spaceship or UFO, which appears throughout Pablo's work in a variety of shapes and sizes, and in his descriptions is usually characterized as the vehicle of benevolent emissaries or superior entities from this or that galaxy or star system. Fairies, mermaids, and dolphins are another apparently "foreign" motif that features prominently in Pablo's work; however, as Luna amply documents, all of these entities, including blond fairies and mermaids and even UFOs, are quite integral elements of Amazonian cosmology; that they also figure importantly in the mythologies of other cultures is perhaps evidence for the universal collective unconscious postulated by C. G. Jung.

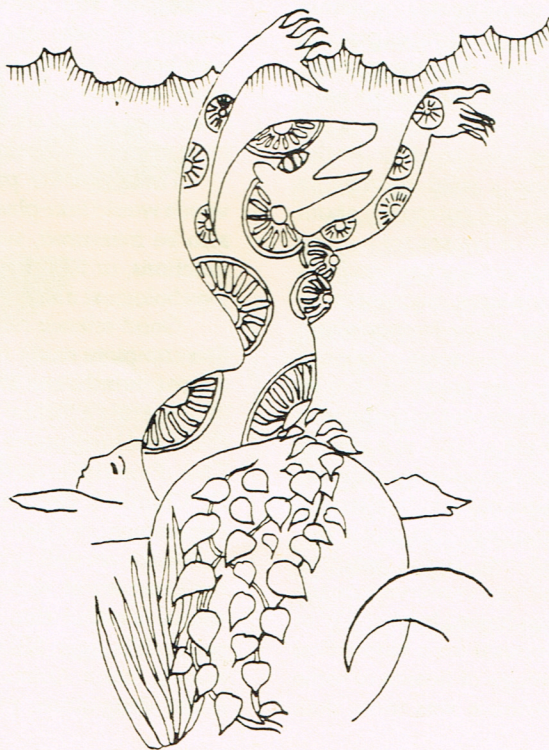
The major portion of the book consists of the 49 paintings; each is accompanied by a detailed description, written by Pablo, which explains the

significance of the plants, beasts, and transdimensional entities and forces which crowd these paintings and which comprise the experiential reality of the vegetalista. While the major iconographic motifs are discussed in general terms in the introduction, here the associated text is quite specific, and in Pablo's own words. Each painting describes a different aspect of ayahuasca shamanism, and the paintings are grouped into sections covering related themes. The first section, "Plant Teachers and Shamanic Powers," covers the preparation of ayahuasca, the origin of the ayahuasca vine and the chacruna admixture, the spirits or mothers of the plants, and how the healers obtain and use their shamanic powers. The archaic (Inca) roots of vegetalismo and the connection of this shamanic tradition with other healing traditions also are included in this section. Part II, the "Spirit World," is further subdivided into three sections which describe the three categories of spiritual entities in the vegetalista cosmology: forest spirits, chthonic spirits, and ouranian spirits. Here one is introduced to the multitudes of evil and beneficent spiritual entities which populate the transdimensional territory, such as the three snake mothers, the *Sachamama*, the *Yakumama*, and the *Huairamama*, which rule the earth, waters, and air, respectively; or

the *Chullachaki*, a forest spirit with his feet turned backwards, who may appear in animal form to lonely hunters, in order to lead them astray and drive them mad. Much of vegetalismo shamanism and curing is concerned with the acquisition and use of techniques and powers for fighting off the influences of treacherous spirits as well as evil human sorcerers, and these themes are dealt with in the third section, entitled "Illness and Curing," and in the fourth section, "Shamanic Fights." Luis Eduardo has carefully annotated Pablo's descriptions with extensive footnotes, and together these make up the text that accompanies each painting. The book is completed by a comprehensive bibliography, in which all of the primary sources and most of the more obscure sources of information on the topic of ayahuasca and the vegetalismo tradition are referenced.

The final product, presented in the format of a "coffee table" art book, is actually much more than that. In the meticulous hands of Eduardo Luna, this book has evolved into a work of serious scholarship, the paintings within it functioning as windows into the mythology and cosmology of Amazonian magic; as such, they are invaluable tools to artists, anthropologists, students of the human psyche, would-be shamans, and even ethnobotanists. Despite its somewhat steep price tag (full-color reproductions of the quality evidenced here do not come cheap), I would recommend this book without reservation to all who take a serious interest in Amazonian shamanism or in the phenomenology of the psychedelic experience. It is to be hoped that a second edition will be issued in paperback as well as hard cover, thus rendering it more affordable for a larger audience. Even at \$60.00, however, the hard cover edition is still a good investment, and those who appreciate the fusion of art, magic, and scholarship that this book represents will find that its value cannot be reduced to mere monetary terms.

**Dennis J. McKenna, Ph.D.,** is an ethnopharmacologist and neurobiologist who has studied the botany, chemistry, and pharmacology of ayahuasca for nearly twenty years.





# THE HOASCA PROJECT

## PROPOSAL FOR A BIOMEDICAL INVESTIGATION OF AYAHUASCA

DENNIS J. MCKENNA, PH.D..

*Ayahuasca*, as readers of *PlantWise* will already know, is a Quechua term meaning "vine of the souls," and is one of the numerous indigenous names for the hallucinogenic drink prepared from a combination of two Amazonian plants, *Banisteriopsis caapi*, and *Psychotria viridis*. In Amazonian Peru and parts of Colombia and Ecuador, the drink is known as ayahuasca; in other parts of the Amazon, it is known as *yage*, *natema*, or *pildé*; in Brazil, it is known as *hoasca*, or sometimes simply "the tea." In whatever cultural context it is found, and by whatever name, ayahuasca plays a pivotal role both in the spiritual life of the populations that use it, and in local ethnomedical practices. The drink is regarded as both a sacrament and a medicine. For the shamans familiar with its properties, it is both a diagnostic aid and a respected teacher; for the patients who seek the healing the shamans can offer, it is the ideal holistic medicine, providing the means to cleanse and heal both the mind and the body. From the perspective of modern psychopharmacology, practically nothing is known of how it actually affects the human mind/body.

Recently, a unique opportunity has become available to carry out a biomedical investigation of the immediate and long-term effects of ayahuasca in human users. This opportunity has resulted from friendships established by the author, Dennis McKenna, with members of a Brazilian organization, the *União do Vegetal* (UDV) which is essentially a syncretic religious movement in which the collective, periodic ingestion of hoasca tea is the central ceremony and sacrament. Unlike the more traditional use of ayahuasca in the context of mestizo or aboriginal shamanism, the use of hoasca tea within the UDV is strictly regarded as a religious or spiritual practice (as opposed to a curing or medical practice). Moreover, many of the younger adherents to the UDV "cult" tend to be well-educated, urban professionals. Some of the members are Western-trained physicians, psychiatrists, or other health professionals, who frequently possess a solid training in medical disciplines and a healthy scientific curiosity about the physical and psychological effects of hoasca tea. They understand as much as anyone does about the active alkaloids found in hoasca tea, and about its putative mechanism of action. They would like to learn all that can be learned about how it works, but at the same time they maintain a sense of reverence regarding their sacrament; they consider that an effort to understand hoasca using the tools and paradigms of science is not a sacrilege, if it is pursued as part of a sincere effort to increase our knowledge of this remarkable medicine.

This enlightened attitude establishes an intellectual climate in which a pharmacological and psychological investigation of hoasca could be carried out, if the required resources were available. While attending a conference on the biomedical aspects of hoasca which was hosted by the UDV in São Paulo in June, 1991, I made a proposal for a biomedical investigation of the human pharmacology of hoasca to some of the leaders of the UDV. The response was more than

receptive; it was enthusiastic. Since this conference, we have remained in frequent contact, and have continued to work together on developing a proposal setting forth the objectives and methodologies for a pilot study on the action of hoasca in humans.

As currently conceived, a number of parameters related to the psychophysiological effects of hoasca will be investigated, among them the following:

- Composition of hoasca teas. The UDV recognizes several kinds of hoasca, which differ in their modes of preparation and in their effects. The composition and amount of active alkaloids in these various types of tea will be analyzed and compared.

- Acute pharmacokinetics of hoasca. Pharmacokinetics is the study of the absorption, metabolism, and excretion of drugs. The pharmacokinetics of the major alkaloids of hoasca (harmine and DMT) will be determined in blood samples taken from volunteers using a technique known as gas chromatography/mass spectrometry (GC/MS).

- Acute/long-term effects of hoasca on serotonergic functions. Hoasca, like other hallucinogens, is known to interact primarily with receptors for the neurotransmitter serotonin. The effects of hoasca on serotonergic functions can be determined in blood and plasma samples by analyzing various parameters, such as levels of hormones known to be modulated by the serotonin system. In addition, blood platelets contain many of the same serotonin receptors that are found in the brain, and psychopharmacologists have long used platelet receptor binding assays as a peripheral marker for changes presumably occurring in the central nervous system. We propose to use platelets to monitor the effects of hoasca on certain serotonin receptor subtypes, and also to measure peripheral monoamine oxidase (MAO) inhibition. These parameters will be measured in volunteers, drawn from the members of the UDV, before and after the ingestion of known doses of hoasca tea. In addition, a parallel study will investigate the possible long-term effects of hoasca by examining these parameters in a group of older *maestres*, members of the UDV who have taken hoasca regularly for much of their adult lives. This group of *maestres* will be compared with a set of age-matched control volunteers who have not taken hoasca.

These are the primary objectives of the initial study, which would take place in Brazil. Additional parameters may also be measured, such as the effect of hoasca on immune functions, or its effect on cognitive function as measured by psychological and cognitive assessment procedures.

Good science cannot be done for free, or even cheaply. The complete study outlined in our proposal would require about 6 months and \$50,000 to complete. We are in the process of preparing a formal grant proposal for submission to NIDA (National Institute on Drug Abuse) in September of this year. The Principle Investigator for the study will be Dr. Charles S. Grob, a psychiatrist and faculty member in the Department of Psychiatry and Human Behavior, U.C. Irvine. Although we will submit the proposal to NIDA, we feel that the prospect of receiving funding for the project from this source is rather slim. In this era of a shrinking government research budget, NIDA is unlikely to fund a grant on a little-known South American hallucinogen that not only is not a major drug-abuse problem, but may actually bring some



benefit to those who use it.

An alternative possibility is to seek funding from non-government sources, either private foundations or interested individuals. One such donor, whose life has been touched in a very personal way by hoasca, has pledged a donation of \$10,000 to support the study. This donation will be placed into a special account, to be administered by Botanical Dimensions and held apart from general operating funds. We are hoping that this will encourage other individuals, who have financial resources and would like to see progress in this field of research, to contribute to the support of this study. We hasten to remind you: Botanical Dimensions operates on a shoestring and depends on your contributions for its general

support. Botanical Dimensions still needs those contributions, in order to continue the work that we are doing to investigate and protect ethnomedical plants and lore. But the hoasca study is also within this spirit and certainly fits within our mandate as an ethnomedical research organization. It is also an opportunity to support the investigation of one of the most significant, but least understood, of the New World hallucinogens.

Individuals who are interested in contributing to the special fund for the Brazilian hoasca study and would like more details on the planned research should contact Dennis McKenna, through Botanical Dimensions.

Finn McKenna



"Sometimes I think the underground is much bigger than the ground."  
—correspondence from Gerd Hojer, Stuttgart, Germany

## Botanical Dimensions' Peruvian Medicinal Plant Collection

Common name: *Mashushillo*, or *Uña de Murcielago*

Tentative identification: *Macfadyena uncata* (Bignoniaceae)

Habitat: Low moist jungle, Peruvian Amazon

Francisco Montes, Peruvian collector for Botanical Dimensions, has collected living specimens of this plant for the ethnomedical garden he manages and we help support, El Jardin Sachamama in Peru. He also sent it to BD in Hawaii, where a thriving specimen is now reaching thirty feet up a tree. It is a delicate climbing vine with claw-like tendrils. [*Uña de murcielago* means "claw of the bat."]

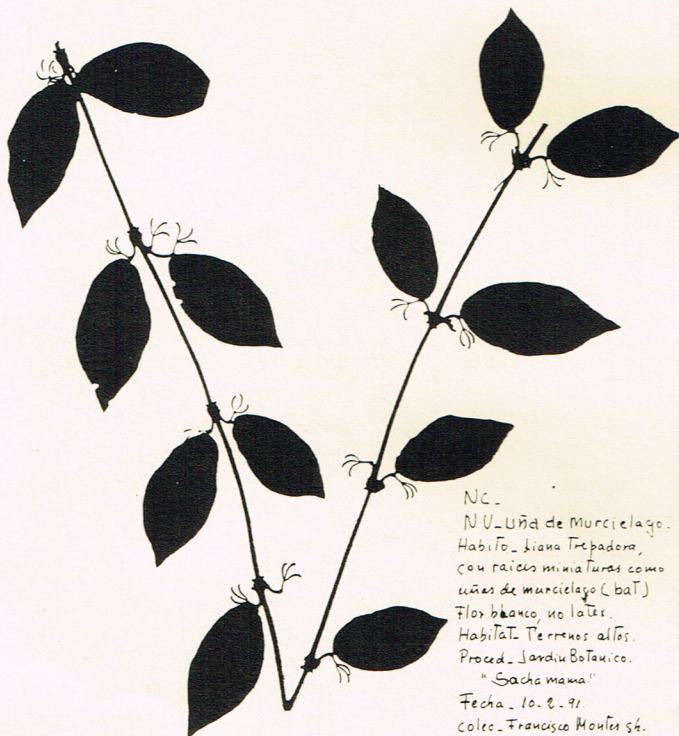
Francisco also creates herbarium specimens, such as the one pictured here.

About its folk use, he reports the following:

"Used as medicine by jungle *indigenas*: Campas, Yaguas and Witotos. Commonly used to cure venomous snakebites. Put the mashed leaf on the affected part. Also one eats the tuber of this herb to neutralize the snake venom.

Campas use this herb to cure their children. When their children are vulnerable, so that no sickness may bother them or have much force, treatment consists in cooking all the herb—leaf, stem, root, including the little tubers. When all is cooked with enough water, the child bathes with this and then chews the fresh leaf. The whole body will be protected from creatures.

Also it is used to cure cancer of the blood." —KHM



NC -  
NU - Uña de Murcielago.  
Habitat - Liana trepadora,  
con raíces minúsculas como  
uñas de murcielago (bat).  
Flor blanco, no látex.  
Habitat: Terrenos altos.  
Proced - Jardín Botánico.  
"Sacha mama"  
Fecha - 10.8.91.  
Colec - Francisco Montes S4.  
Iguitos - Peru.



## Islands, Plants and Polynesians: An Introduction to Polynesian Ethnobotany

Edited by Paul Alan Cox and Sandra Banack, hardcover, 228 pp., 16 b&w photos.

Dioscorides Press, 9999 S.W. Wilshire, Portland OR 97225, \$38.70 postpaid.

### Reviewed by Rob Montgomery

The Polynesian triangle's history of repeated waves of human migration is a relatively recent one, traced from circa 1300 B.C. As befits the interdisciplinary nature of ethnobotany, this study of Polynesian plant/human dynamics draws from anthropology, linguistics, botany, genetics and horticulture to present an integrated view of the nature of coevolution, migration and adaptation between people, their culture, plants and the environment of South Pacific islands.

These are the published proceedings of a 1988 symposium, "Plants and Man in Polynesia," with each chapter a presentation by an expert in an ethnobotanical field. As a whole, the text represents a high standard (increasingly typical of Dioscorides/Timber Press) toward which future books on ethnobotany of other regions should strive. The editors have been criticized for giving short shrift to the individual authors of the contained papers, which are arranged in a natural sequence from the history of canoe-faring exploration to more deliberate colonization and the crucial role of the plants which these cultures transported, encountered and developed.

The book gives us a compelling vision of the depth and scale of the bond between plants and humans across time and over distances, how culture is molded and defined by the plants it coevolves with, how the plants species themselves then too become modified as cultivars (varieties produced by selective breeding). Polynesian voyaging and the spread of useful plants in their prehistory can be re-traced to shed light on the signal questions of paleoethnobotany: how, when and from where did these plants come? From the remains of colossal breadfruit fermentation pits to the chromosome count and chemical races among *kava* cultivars, the story of past colonization, warfare, interisland trade and plant domestication is unraveled in this surprisingly clear, accessible and completely engaging introduction.

Since so very few of the truly native species encountered by the first voyages

reaching Polynesian islands were useful plants, most of what comprises the ethnobotanical repertoire of modern Polynesian cultures are in fact introduced plants. Of the aboriginal plant introductions (as opposed to "modern" post-European-contact introductions, since 1769), only 72 species are involved, elaborated over generations of horticulture into thousands of cultivars. The many strains of sugarcane, sweet potatoes, bananas, taro and kava which exist and have distinct and appropriate uses owe their existence to the profound and constant bond of humans, culture and plants. Today, in Polynesia as everywhere, diversity of all types—cultural as well as botanical—is terminally threatened by an ambitiously domineering mercantile/industrial global phenomenon. The extinction of plant cultivars is as rapid as the extinction of knowledge of their intended uses.

Of the medicinal plants in Polynesian ethnobotany, 66% are not used for medicine anywhere else. The early people arriving there encountered species related to ones they knew and by imposing the traditions of their homeland, crafted a new ethnobotany in tandem with the species and cultivars they carried with them. Today, Polynesian herbalists serving their ethnic communities abroad (for example, in Los Angeles) rely on consignments of medicinal plant products flown in from their Pacific island sources.



*Artocarpus altilis* (Moraceae): Breadfruit

One of the most interesting chapters of the book is devoted to *kava*, basically the only recreational or psychoactive drug in the Pacific flora. The many cultivars of *Piper methysticum* are widely distributed, vegetatively propagated, and have never been known to set seed. Author and ethnobotanist Vincent Lebot has been on a quest to discover the origin of kava, geographically, as an indicator of Pacific populations' migrations. The chemotaxonomic signatures of kava cultivars show human migration patterns across the Pacific, when examined island to island for differences and relationships. People have selectively chosen these cultivars for their specific pharmacologic activity, in this case, psychoactivity. Lebot's masterful study is based on the knowledge that the "geneology of clones, from wild species to the cultivars, is a lineage of chemotypes" [A chemotype is a plant strain with a unique chemical profile.] By linking these chemotypes with linguistic affinities, he shows the routes of prehistoric migration and exchange, by travelers, of the planting stock and preparation techniques. In essence, chemotypes among cultivars of *P. methysticum* are based on ratios of six kavalactones present in the rhizomes. Farmers would select by replanting clones of plants which produced the best intoxication. Kava drinkers are after a soothing tranquilizer without unpleasant side-effects; it acts on the spinal system rather than the central nervous system, so mental clarity, if not physical coordination, is maintainable. The fact that gradual domestication and development of desirable kava cultivars could be brought about from the wild ancestral species (which produces intense nausea) is a tribute to the perseverance of the early Polynesians, propelled by the universal human pursuit of intoxication.

Even casual students of ethnobotany will enjoy this book and gain a worthwhile insight into the marvelous realm in which the affairs of plants and humanity forever intersect.



For those of you who have wondered: After sixteen years together, Terence and I separated last year, and are taking different paths with our lives and our work. He is following his chosen career as a speaker and writer, I am continuing to manage Botanical Dimensions and doing my artwork. The dissolution of a family is a very difficult time, but the children are okay, life here goes on. Let me assure you that BD is alive and well, a viable non-profit organization with many aspects and much promise. A recent meeting of the board of directors clarified our roles, with me remaining president and project director, and Terence relinquishing his role as secretary. We are both still on the board.

Those directors who live on the East Coast or in Europe have been made advisors, due to the difficulty of attending meetings here in California. All bookkeeping has been moved out of the office into the hands of a capable service, and two part-time assistants are helping with the mailing list and herbarium work in the office.

The garden on Hawaii is doing well, many more plants out of the shadehouse and in the ground along the trails. I worked with the caretaker there in January, and will again this summer. The Peruvian garden—el Jardin Sachamama—is thriving under the care of Francisco Montes and several Yagua helpers. Actually, our continued support of that effort is helping it become a

## UPHILL DOWNHILL

by

Kathleen Harrison-McKenna

meaningful living collection of important medicinal plants, identified and tended by local indigenous people. They appreciate it at least as much as we do. To help them create a broader support system, Francisco and I are looking for a way to market certain common yet valuable medicinal plant products that can be harvested sustainably there and sold in their natural form to local or foreign markets. In an era when the FDA is unwilling to license herbs and supplements that are accompanied by any health claims, it seems difficult to approach the marketplace in this country. Europe is far more open-minded about phytochemicals, and far less regulated. Peru's chaotic economy and health problems are such that inexpensive, unprocessed, effective medicines are the only choice for many people. Gentle, sustainable harvesting of medicinal plants is an obvious way to benefit all parties.

I look forward to a likely trip to Ecuador and Peru in November, investigating plants and folk data, bringing back treasures to identify and propagate. This past December, my children and I participated in a week-long ethnobotany workshop in the state of Veracruz, Mexico, with names you

know from PlantWise: Bret Blosser and Rob Montgomery. Author Jonathan Ott (Hallucinogenic Plants of North America, The Chocolate Addict) was a dynamic teacher. The Botanical Preservation Corps (PO Box 1368, Sebastopol CA 95473) sponsors seminars on ethnobotany in diverse tropical settings.

Botanical Dimensions is grateful to the individuals who have given support this past winter and spring, and to the following for their confidence and grants: Threshold Foundation, \$9,570; the Nathan Cummings Foundation, \$5,000; the Hunt Foundation, \$2,500; Robert Barnhart, \$5,000. In these rough economic times, contributions have been less than before and the budget tight, so if you can, please send a check to BD supporting the work described herein. Your donations are tax-deductible and are the sun and rain needed to keep it all alive.

One of the main influences on my life and work this past year has been learning from my father as he deals with cancer. He showed courage and determination as he endured various treatments, and now with grace and wit faces the cancer's untreatable recurrence. An innate taoist, a student of nature, he knows how the water flows and is flowing with it. (He spent a lifetime showing people undersea gardens.) From him I have learned to appreciate every day, keep my eyes open to the small beauties, and be grateful. —KHM

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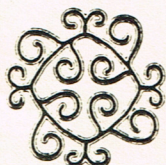
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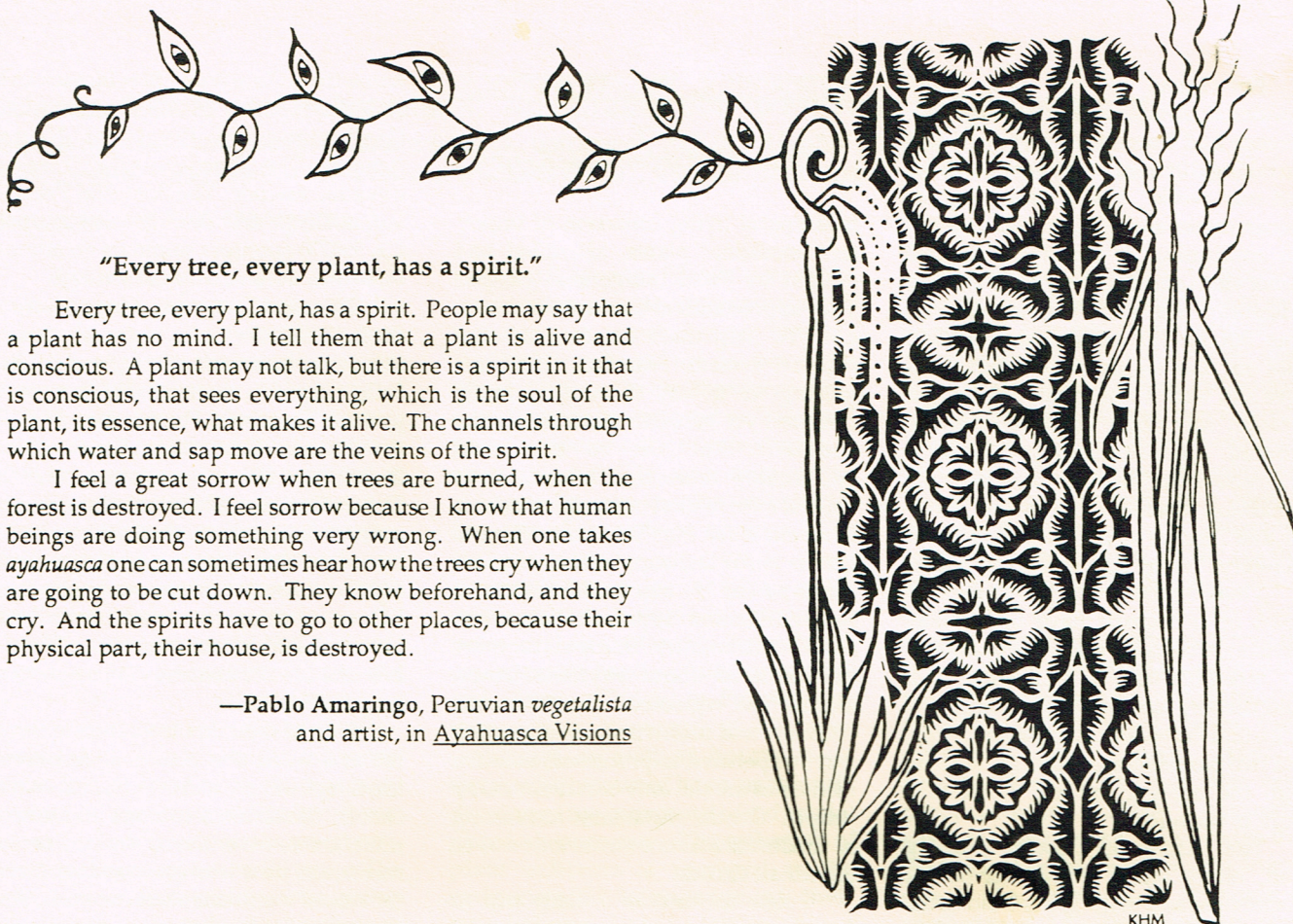
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**"Every tree, every plant, has a spirit."**

Every tree, every plant, has a spirit. People may say that a plant has no mind. I tell them that a plant is alive and conscious. A plant may not talk, but there is a spirit in it that is conscious, that sees everything, which is the soul of the plant, its essence, what makes it alive. The channels through which water and sap move are the veins of the spirit.

I feel a great sorrow when trees are burned, when the forest is destroyed. I feel sorrow because I know that human beings are doing something very wrong. When one takes *ayahuasca* one can sometimes hear how the trees cry when they are going to be cut down. They know beforehand, and they cry. And the spirits have to go to other places, because their physical part, their house, is destroyed.

—Pablo Amaringo, Peruvian *vegetalista*  
and artist, in *Ayahuasca Visions*

## PlantWise

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"to collect, protect, propagate and understand  
plants of ethnomedical significance  
and their lore."